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TIMBER RESOURCES OF IDAHO

ALVIN K. WILSON

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FOREST SERVICE

U. S. DEPARTMENT OF AGRICULTURE

OGDEN, UTAH

REED W. BAILEY, DIRECTOR

FOREWORD

A recent comprehensive review of the nationwide forest situation (17)* stresses that expected population increases may greatly increase demands for timber from the Nation's forests. In the past, the demand for wood has risen with the country's growth, and recent industry and population trends indicate that pressures for greater production and more intensive utilization of timber resources will continue.

Another recent study (3) suggests (a) that it may be impossible to meet the Nation's potential demands for wood without drawing heavily on Mountain States timber, (b) that the shifting timber supply situation between regions is steadily improving the competitive position of Mountain States timber, and (c) that the population increase in the Mountain States (which has been proportionately large in comparison with that of other regions in recent years and promises to continue so) should provide greatly expanded local markets for timber products.

These trends have special significance for Idaho, inasmuch as its output of timber products is the greatest of any of the Mountain States. It is therefore appropriate to take a detailed look at Idaho's timber resources.

The statistics and discussion that follow are based on the most recent surveys. Results of the initial Forest Survey of northern Idaho, completed in 1938, were published in 1942 (4). A second survey was made between 1947 and 1951, and its results were published in 1953 (5). The inventory data in this report were taken from the second survey and a 1950-54 survey in southern Idaho. The northern Idaho data were adjusted to allow for beetle-caused losses in Douglas-fir and Engelmann spruce that occurred after the inventory had been made.

The Forest Survey in Idaho represents the combined work of so many individuals that it is impractical to list all of them here. The northern Idaho surveys were conducted by personnel of the former Northern Rocky Mountain Forest and Range Experiment Station; the survey of southern Idaho is the result of the combined efforts of Forest Service Region 4 and Northern Rocky Mountain Station personnel. Harry W. Camp, Paul D. Kemp, and Melvin E. Metcalf directed the work of the NRM Station personnel; Joel L. Frykman, Clair R. Melvin, and Mark M. Johannesen were successively project leaders for the southern Idaho survey work done by Region 4.

**Italic numerals in parentheses refer to numbered items in the References section.*

THE TIMBER RESOURCES OF IDAHO

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INTERMOUNTAIN FOREST & RANGE EXPERIMENT STATION
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United States Department of Agriculture
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The Author

ALVIN K. WILSON is in charge of the products and timber cut phase of the Forest Survey at Intermountain Forest and Range Experiment Station. After working in Forest Survey at the Northeastern Forest Experiment Station, he transferred to forest management research at Intermountain Station in 1949, returning to forest survey work in 1957. He is author of some 25 publications on forest management and forest economics subjects and coauthor of 4 others.

HIGHLIGHTS

- Idaho has 21.8 million acres of forest occupying more than two-fifths of the State. Seventy-three percent of the forest land (15.8 million acres) is classed as commercial. This is divided about equally between the northern and southern portions of the State.¹
- 8.7 million acres of the commercial forest is sawtimber. The principal commercial forest types are:

Douglas-fir	4.8 million acres
Lodgepole pine	3.0 million acres
Ponderosa pine	2.6 million acres
Western white pine	1.9 million acres
- Four-fifths of the forest land is managed by the Federal Government. Most of this is national forest which contains 16.3 million acres of forest land including 11.3 million acres of commercial forest.
- Twenty percent of the commercial forest is in private holdings. Most of these private lands are in northern Idaho.
- The total volume in sawtimber trees is 115 billion board feet.² One-third of that volume is Douglas-fir.
- The net annual growth of sawtimber is 1.6 billion board feet.
- The sawtimber cut in 1956 was 1.9 billion board feet. During the period 1947-54 the average annual cut was 1.3 billion board feet.
- Most of the timber cut has been from private lands. However, the sawlog output from the national forests, as a percentage of total output, has been rising.

¹ The deep canyon of the Salmon River is the natural dividing line between the two commonly recognized (in Idaho) subunits. For this report, the Little Salmon River and the Adams-Idaho County line complete the separation into subunits on the western side of the State; on the eastern side, all of Lemhi County is included with southern Idaho.

These subunits are geographically and economically distinct. Only one intrastate highway joins the northern and southern subunits; there is no intrastate rail connection. Economically, northern Idaho is tied to the Inland Empire while southern Idaho's economy is mainly related to the Snake River Plains.

² International $\frac{1}{4}$ -inch log rule board-foot volumes are used throughout this report.

FOREST LAND AREAS

- Idaho has 21,815,000 acres of forest land. This is more than two-fifths of the total land area of the State. Only eight states have more forest land, and of the Rocky Mountain States, only Montana has more than Idaho (by about one-half million acres).

Practically all this forest land is on a branch of the Rocky Mountains that reaches from Canada southward through the Idaho Panhandle to the Salmon and Sawtooth Mountains of the south-central part of the State. The main forested area of Idaho varies from 45 to 120 miles wide and stretches for 400 miles from the Canadian boundary to the Snake River Plains of southern Idaho. Smaller forested areas are located in southeastern Idaho, where the middle Rockies extend into the State.

Although the total land area of northern Idaho is less than one-third that of southern Idaho, the two subunits share the State's forest lands about equally. In northern Idaho, 10.2 million acres of forest land occupy 81 percent of the total land area, while 11.6 million forested acres cover 29 percent of southern Idaho.

Total forest land area by major classes

Class	State	Northern	Southern
	<i>Million acres</i>		
Commercial:	15.8	7.8	8.0
Noncommercial:			
Productive-reserved	1.9	.9	1.0
Unproductive	4.1	1.5	2.6
Total	21.8	10.2	11.6

- Commercial forest land includes land capable of, and available for, producing commercially valuable tree crops. Seventy-three percent of the State's forest area belongs in this broad land classification. Idaho accordingly ranks sixteenth among all states and first among the Mountain States in commercial forest land area.

Commercial forest land area by stand-size classes

Class	State	Northern	Southern
	<i>Million acres</i>		
Sawtimber	8.7	3.5	5.2
Poletimber	3.9	1.9	2.0
Seedling-sapling	1.6	1.2	.4
Nonstocked and other	1.6	1.2	.4
Total	15.8	7.8	8.0

- Sawtimber stands occupy 8.7 million acres or more than half the commercial forest area. Only four states (Oregon, Washington, California, and Alaska) have more sawtimber area than Idaho. It is estimated that more than a third of the sawtimber stands are old-growth timber. The large amount of old-growth timber reflects the slower exploitation rate (as compared to other regions) that has prevailed in Idaho and other Mountain States until recently. It also presents forest land managers with a series of complex problems having to do with (a) prevention of excessive losses in timber that is overmature and highly susceptible to damage by insects, disease, windthrow, and other agencies; (b) economically salvaging losses that do occur; and (c) the orderly conversion of these old-growth stands to healthy managed stands.

Northern Idaho has had a history of more intensive use than southern Idaho. This is reflected in the fact that sawtimber stands now occupy 45 percent of the commercial forest land in that part of the State, but they occupy 65 percent of the commercial forest land of southern Idaho.

- Poletimber stands have less than 1,500 board feet per acre and are characterized by trees between 5 and 11 inches in diameter. These stands occupy one-fourth of the State's commercial forest land.
- One-fifth of the commercial forest land is seedling-sapling stands and nonstocked areas.

The striking feature in the distribution of these size classes is that three-fourths of the total area of each is in northern Idaho. This again reflects the longer history of use in northern Idaho but is also due to northern Idaho's severe fire history. The worst fires in northern Idaho were in 1910; they burned over an estimated 1.9 million acres. Large areas were also burned in 1919, 1926, 1929, 1931, and 1934. More than 1 acre out of every 7 of commercial forest land in northern Idaho is nonstocked. Given enough time, much of this land would restock naturally, but many nonstocked areas have persisted for 40 years or more. Over large areas, brush cover, steep topography, and inaccessibility complicate the rehabilitation that must be done if these lands are to contribute effectively to meet increased forest products requirements a few years from now.

- Six million acres of Idaho's forest are non-commercial. Of this 6 million acres, more than

4 million belong in the noncommercial class because they are unproductive for timber use. Typically, these are adverse sites including extremely rocky land, subalpine areas, or certain kinds of persisting brushlands where tree form and growth rates are so poor as to exclude them from consideration as economically feasible timber sources. However, some isolated areas capable of producing timber crops may be included as unproductive because they are physically and economically inaccessible.

Noncommercial forest land in the "productive-reserved" category totals 1.9 million acres. These lands could produce commercially valuable timber crops but are not available for this use because of their reserved status. Nearly all of this land is in wilderness areas (the Selway-Bitterroot and Sawtooth), the Idaho Primitive Area, and Yellowstone National Park. However, a small amount of State-owned land is reserved also.

FOREST LAND OWNERSHIP

- A high percentage of Idaho's forest land area is federally managed. Either through ownership or trusteeship (in the case of Indian lands), the Federal Government is responsible for four-fifths of Idaho's 21.8 million forested acres. Most of these acres are in 16 national forests.³ The national forests contain 16.3 million acres of Idaho's forest land. Indian lands, Bureau of Land Management lands, and national park lands make up the remainder of the Federal area. Private holdings, mostly in nor-

thern Idaho, contain 15 percent of all forest land. The remaining 5 percent are State-owned lands.

- Seventy-one percent of the 15.8 million acres of commercial forest land is in national

Commercial forest land area by ownership classes

Class	State Northern Southern		
	Million Acres		
National forest	11.3	4.4	6.9
Other Federal	.5	.2	.3
State	.9	.7	.2
Private	3.1	2.5	.6
Total	15.8	7.8	8.0

³ Eight national forests (the Coeur d'Alene, St. Joe, Clearwater, Nezperce, Payette, Boise, Salmon, and Challis) are entirely within Idaho. The major parts of four more (the Kaniksu, Sawtooth, Targhee, and Caribou) are within the State, and parts of four others (the Kootenai, Lolo, Bitterroot, and Cache) extend into Idaho from neighboring states.

forests, and other federally managed areas account for another 3 percent. Private holdings contain 20 percent of the commercial forest land. Four-fifths of the private holdings are in northern Idaho and more than half of their total area is in industrial ownership. Two-thirds of the State-owned commercial forest land is also in northern Idaho.

- Of Idaho's 6 million acres of noncommercial forest land, 5 million acres (84 percent) are in national forests. More than half of this 5 million acres is in the Selway-Bitterroot and

Sawtooth Wilderness Areas and in the Idaho Primitive Area.

Noncommercial forest land area by ownership classes

Class	State Northern Southern		
	<i>Million Acres</i>		
National forest	5.0	2.2	2.8
Other Federal	.5	(¹)	.5
State	.2	.1	.1
Private	.3	.1	.2
Total	6.0	2.4	3.6

¹ Less than 0.05 million acres.

TIMBER VOLUMES

- Idaho's commercial forest contains 115 billion board feet in sawtimber trees (trees of commercial species that are 11.0 inches or larger in diameter at breast height and contain at least one merchantable sawlog). In the United States, greater sawtimber volumes are found only in the four Pacific Coast States. Among the Rocky Mountain States, Idaho's sawtimber volume is twice that of the next most heavily timbered state.

More than 95 percent of the sawtimber tree volume is in sawtimber stands (stands containing 1,500 board feet per acre or more in sawtimber trees). Northern Idaho has 53 percent of the State's total sawtimber volume.

- Douglas-fir is the most abundant timber species in Idaho. It constitutes nearly a third of the State's total sawtimber volume. There is, in fact, almost twice as much Douglas-fir as there is ponderosa pine, the second ranking species. Four principal species—Douglas-fir, ponderosa pine, the true firs (mostly grand fir), and western white pine—make up more than three-fourths of the sawtimber. Most of the

Douglas-fir and ponderosa pine grows in southern Idaho, but northern Idaho has all of the highly valuable western white pine and most of the volume in true firs.

Net board-foot volume in sawtimber trees by species

Species	State Northern Southern		
	<i>Billion board feet¹</i>		
Douglas-fir	36.6	11.4	25.2
Ponderosa pine	19.3	6.9	12.4
True firs ²	19.2	11.9	7.3
Western white pine	13.4	13.4	0
Spruce	9.6	4.8	4.8
Western larch	6.1	5.6	.5
Lodgepole pine	4.8	1.2	3.6
Other species	6.0	5.5	.5
Total	115.0	60.7	54.3

¹ International $\frac{1}{4}$ -inch log rule. Scribner log rule volumes can be approximated by multiplying the above figures by 0.89.

² Grand and subalpine firs.

- Half of the State's sawtimber volume is in trees between 11 and 20.9 inches in diameter, and an additional third is in trees from 21 to 30.9 inches in diameter. The remaining 17 percent of the volume is in trees larger than 31 inches—definitely in the overmature category, which is especially susceptible to mortality losses.

The State's 15.8 million acres of commercial forest land have an average of 7.3 thousand board feet per acre in sawtimber trees. Sawtimber stands alone average 12.6 thousand board feet per acre.

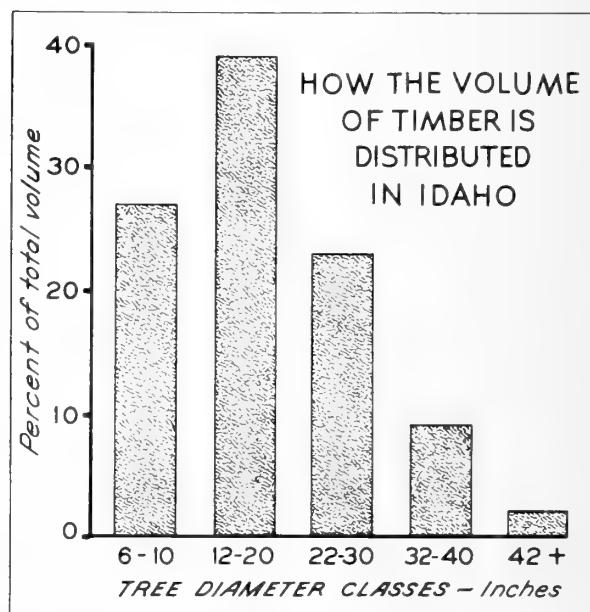
- The total volume of all "growing stock" is 26 billion cubic feet. This volume includes trees of commercial species 5.0 inches and larger in diameter at breast height that meet Forest Survey standards for soundness and form (see definitions). Sawtimber and poletimber stands together contain 98.7 percent of all growing stock volume in Idaho.

- Thirty percent of the growing stock is Douglas-fir. This species is particularly important in southern Idaho, which has two-thirds of the Douglas-fir. The true firs rank second although their total volume is only slightly more than half that of Douglas-fir. Lodgepole pine ranks only seventh in sawtimber volume, but ranks third in growing stock volume. Two-thirds of the lodgepole pine growing stock is in southern Idaho.

Net cubic-foot volume in growing stock trees by species

Species	State	Northern	Southern
	<i>Billion cubic feet</i>		
Douglas-fir	7.7	2.5	5.2
True firs ¹	4.2	2.5	1.7
Lodgepole pine	3.7	1.2	2.5
Ponderosa pine	3.2	1.2	2.0
Western white pine	2.4	2.4	0
Spruce	1.8	.9	.9
Western larch	1.3	1.2	.1
Other species	1.6	1.3	.3
Total	25.9	13.2	12.7

¹ Grand and subalpine firs.



Board-foot volume per acre¹ in sawtimber trees by stand-size classes

Stand-size classes	State		Northern		Southern	
	Percent of commercial forest area	M b.f. per acre	Percent of commercial forest area	M b.f. per acre	Percent of commercial forest area	M b.f. per acre
Sawtimber	55	12.6	22	16.5	33	9.9
Poletimber	25	1.2	12	1.1	13	1.2
Seedling-sapling	10	.2	7	.2	3	.4
Nonstocked and other	10	.2	8	.2	2	.2
All classes	100	7.3	49	7.8	51	6.7

¹ International $\frac{1}{4}$ -inch log rule.

PRINCIPAL FOREST TYPES AND SPECIES

On the following pages, the most important forest types and timber species in Idaho are discussed. These are:

- Douglas-fir
- Ponderosa pine
- Spruce and true firs
- Western white pine
- Western larch
- Lodgepole pine

In the table and text for each, it should be noted that (a) *area data* apply to the forest type, which can and often does contain several species other than the one for which the type is named; and (b) *volume data* apply to the subject species only, and include its volume wherever the species occurs. For the convenience of those interested in the principal statistics for individual types and species, some data presented elsewhere are repeated here.



Douglas-fir

AREA of the Douglas-fir type (thousands of acres):

	State	Northern	Southern
Sawtimber stands	3,606	668	2,938
Poletimber stands	694	339	355
Seedling-sapling stands	224	181	43
Nonstocked and deforested	274	98	176
Total	4,798	1,286	3,512

VOLUME of Douglas-fir timber (billions):

Sawtimber (board feet)	36.6	11.4	25.2
Growing stock (cubic feet)	7.7	2.5	5.2

DOUGLAS-FIR⁴ is one of the most widely distributed timber species of the United States; on the basis of total stand volume, it is the most important timber tree in the country. In these respects, the situation of Douglas-fir is much the same in Idaho as in the Nation. Other species, notably western white pine and ponderosa pine, command higher prices in Idaho's timber markets, but Douglas-fir is the most abundant and widespread species, and it provides a larger proportion of the timber cut than any other single species.

The Douglas-fir type occupies nearly one-third of Idaho's commercial forest land. Its 4.8 million acres are distributed throughout the State, but most of the acreage (73 percent) is in southern Idaho.

Commercial forest lands support 36.6 billion board feet of Douglas-fir sawtimber—32 percent of the State's total sawtimber volume. Although trees larger than 40 inches d.b.h. are not infrequent, about half of the sawtimber volume is in trees between 11 and 21 inches

⁴ Two forms of Douglas-fir, the coast and inland forms, are commonly recognized. Only the inland form occurs naturally in Idaho.

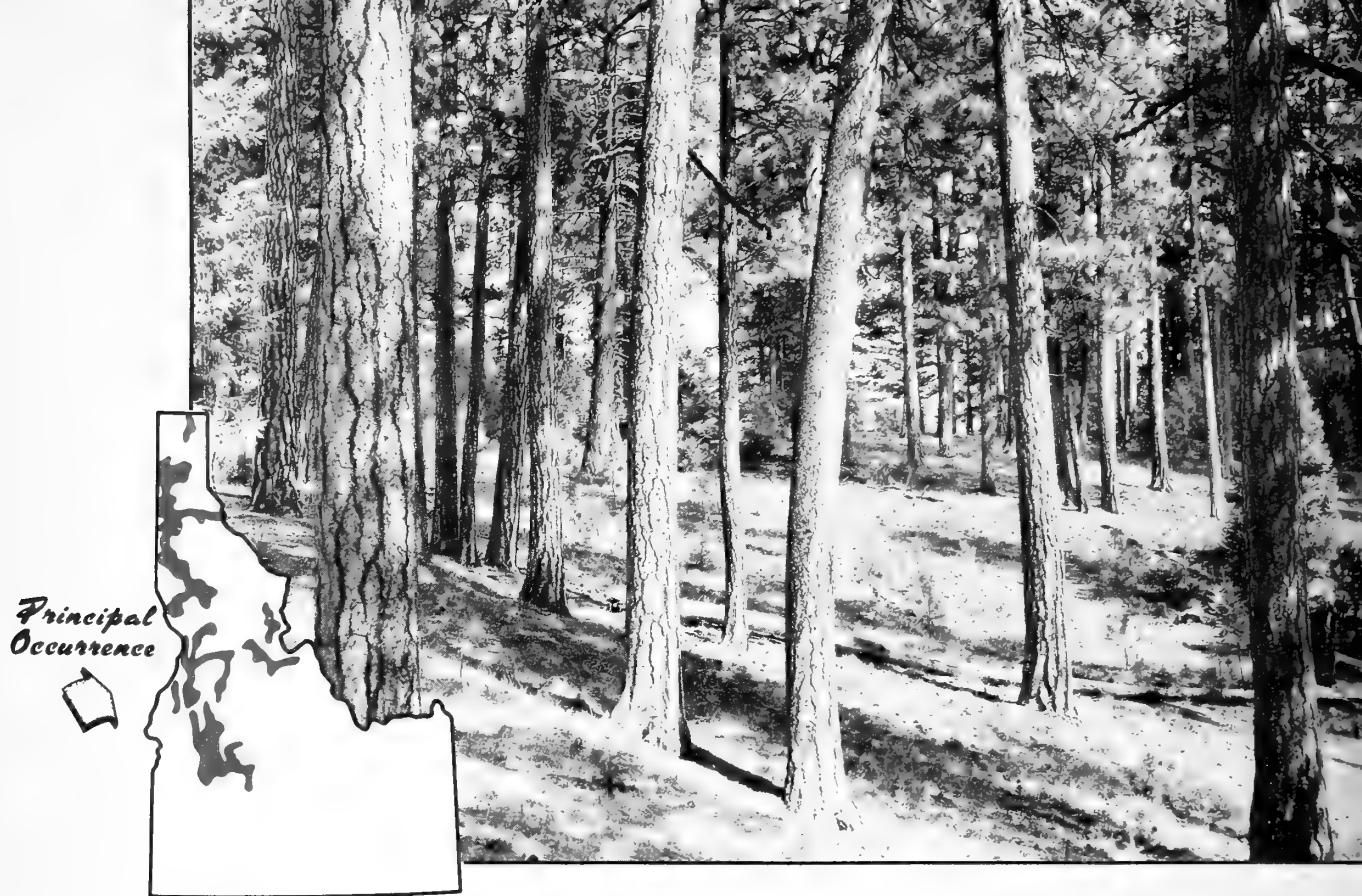
d.b.h. and 85 percent is in trees smaller than 31 inches.

Because it is widely distributed, generally accessible, and is one of the two strongest of Idaho's native softwoods,⁵ Douglas-fir has been used for lumber and other products since the beginning of settlement in the State. It also supplies a substantial part of the lumber exported to other states.

In years past, the output of Douglas-fir lumber has been exceeded by the production of white pine and ponderosa pine. Recently, however, the output of these latter two species has declined, and production from Douglas-fir has mounted. Douglas-fir moved into first place in 1956.

It is becoming increasingly evident that in the future Douglas-fir will be cut in greater amounts to meet demands for lumber, veneer, and commercial poles and pulpwood, if only because of its abundance in the State's timber stands.

⁵ In combined bending and compressive strength, western larch is the strongest, followed by Douglas-fir. (U.S.D.A. Forest Products Laboratory Report No. 1169, rev. 1956.)



Ponderosa Pine

AREA of the ponderosa pine type (thousands of acres):

	State	Northern	Southern
Sawtimber stands	1,936	600	1,336
Poletimber stands	274	223	51
Seedling-sapling stands	127	121	6
Nonstocked and deforested	287	165	122
Total	2,624	1,109	1,515

VOLUME of ponderosa pine timber (billions):

Sawtimber (board feet)	19.3	6.9	12.4
Growing stock (cubic feet)	3.2	1.2	2.0

PONDEROSA PINE is the most widely distributed pine species in North America and is one of the most important timber trees of the United States.

In the interior of western United States, the ponderosa pine type is typically the first timber type of consequence encountered as one proceeds from the deserts, valley bottoms, and prairies to higher elevations. Since the valleys and prairies were the routes of travel and the sites of earliest settlement, the ponderosa pine type has been used longer and more continuously than any other.

In Idaho the ponderosa pine type is the third most extensive and covers slightly less than 17 percent (2.6 million acres) of the

State's commercial forest land. Fifty-eight percent of the ponderosa pine area is in southern Idaho.

Ponderosa pine sawtimber totals more than 19 billion board feet; 64 percent of this volume is in southern Idaho. The species accounts for 17 percent of the State's sawtimber volume and is second in volume only to Douglas-fir.

Between 1900 and the late 1940's, except for a short period in the early 1930's, ponderosa pine consistently made up 25 to 40 percent of the timber cut. Production of lumber from this species reached its all-time peak, 417 million board feet, in 1948, but since then has fallen. In 1956 the production of ponderosa pine lumber was 304 million board feet.



Spruce and True Firs

AREA of the spruce and true fir types (thousands of acres):

	State	Northern	Southern
Sawtimber stands	1,311	771	540
Poletimber stands	257	125	132
Seedling-sapling stands	109	103	6
Nonstocked and deforested	78	40	38
Total	1,755	1,039	716

VOLUME of spruce and true fir timber (billions):

Sawtimber (board feet)	28.8	16.7	12.1
Growing stock (cubic feet)	6.0	3.4	2.6

ENGELMANN SPRUCE and two true firs, **GRAND FIR** and **SUBALPINE FIR**, are widely distributed in Idaho. Each one is the characterizing species of a recognized forest type, but the three are grouped here because (a) they frequently occur in mixture with each other and as associates in a number of other types; (b) all three species have several similarities for utilization; and (c) the wide dispersion of the individual types makes it virtually impossible to show them separately on a generalized forest type map.⁶

The spruce-true fir group of types occupies 11 percent of Idaho's commercial forest land. Half of this area (874,000 acres) is in the grand fir type and the rest is divided almost equally between the Engelmann spruce (+63,000 acres) and the subalpine fir (+18,000 acres) types. These types occur in practically all of the timbered parts of the State but the most extensive areas are in the central portion.

Commercial forest land area in the spruce type is about equally divided between the State subunits, but practically all of the grand fir

type is in northern Idaho while all of the commercial subalpine fir type is in the south.

Together these species constitute about one-fourth of the State's sawtimber inventory. One-eighth of the sawtimber is grand fir, which ranks third after Douglas-fir and ponderosa pine. Eight percent of Idaho's sawtimber is Engelmann spruce and 5 percent is subalpine fir.

Lumber production from the true firs, which averaged about 100 million board feet a year in the late 1940's, reached 305 million board feet in 1956. The market status of Engelmann spruce was especially improved by an aggressive salvage and sales program that began in 1952 to reclaim beetle-killed spruce in northern Idaho counties. The cut of spruce lumber increased twelvefold between the late 1940's and 1956. Lumber from spruce and the true firs comprised one-third of the State's total production in 1956.

All three species are suitable for pulping and have provided an important part of the wood supply for Inland Empire mills. Some pulpwood has been shipped to the west coast also. During the period 1948-56 about 55 percent of the round pulpwood cut in Idaho was of these species.

⁶ Separate area data for each type and volume data for each species are given in supplementary tables 14, 17, and 18 in the Appendix.



Western White Pine

AREA of the western white pine type (thousands of acres):

	State	Northern	Southern
Sawtimber stands	782	782	0
Poletimber stands	316	316	0
Seedling-sapling stands	142	142	0
Nonstocked and deforested	680	680	0
Total	1,920	1,920	0

VOLUME of western white pine timber (billions):

Sawtimber (board feet)	13.4	13.4	0
Growing stock (cubic feet)	2.4	2.4	0

WESTERN WHITE PINE is the most valuable of Idaho's tree species. White pine sawtimber stands represent more than a third of the value of all the State's sawtimber,⁷ although they contain less than one-eighth of all sawtimber volume. About 1900, they were a major factor in attracting lumbermen from other parts of the country.

All of Idaho's western white pine grows in the northern subunit, where the type occupies 25 percent of the commercial forest. Most of the white pine land is in Shoshone and Clearwater Counties.

White pine blister rust has made considerable inroads in the type. This disease was introduced into Idaho in 1923. Although a control program has been effective in curbing the disease, many white pine stands outside the control zone have been hard hit by blister rust. Extensive areas of white pine have been converted to other forest types by the killing off of their western white pine component. Since

this conversion has taken place largely in young stands, the disease has not greatly affected the supply of old-growth western white pine timber.

Idaho has nearly two-thirds of all the western white pine sawtimber in the United States. The present volume of 13 billion board feet is about 60 times the annual rate of cutting in the State in recent years.

Western white pine has been one of the main supports of Idaho's lumber industry for most of the industry's existence. Between 1913 and 1940 more than two-fifths of all the lumber produced in the State was white pine, turned out at an average annual rate of 322 million board feet. In the depression year of 1932, when lumber output sank to the lowest point since 1905, total production was only 248 million board feet but 68 percent of it was white pine. White pine lumber production reached an all-time peak of 460 million board feet in 1937, while the depression was still being felt.

About 1940, however, production of white pine lumber began to decline rapidly and has since leveled off at about 200 million board feet annually.

⁷ Estimated from Forest Service Region 1 average stumpage prices for 1958.



Western Larch

AREA of the western larch type (thousands of acres):

	State	Northern	Southern
Sawtimber stands	306	302	4
Poletimber stands	190	189	1
Seedling-sapling stands	169	169	(¹)
Nonstocked and deforested	65	64	1
Total	730	724	6

VOLUME of western larch timber (billions):

Sawtimber (board feet)	6.1	5.6	0.5
Growing stock (cubic feet)	1.3	1.2	.1

¹Less than 500 acres.

The range of WESTERN LARCH in northwestern United States is centered in northern Idaho. It is the largest of the American larches and is one of the best formed of Idaho's timber species. Individual trees occasionally exceed 40 inches in diameter, but 83 percent of the sawtimber volume is in trees between 11 and 31 inches in diameter. Because the mature trees are typically tall and straight and have a high percentage of clear length, western larch can produce more clear wood than any other local species.

Western larch is a northern species; only 6,000 acres of the type occur in southern Idaho. Sawtimber stands occupy 42 percent of the type area.

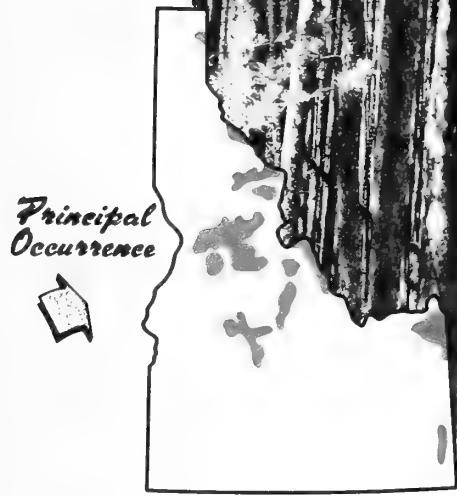
More than one-fifth of all the western larch sawtimber in the United States grows in Idaho. This volume, 6.1 billion board feet, is about 5 percent of the State's total sawtimber volume.

Western larch is often not distinguished from its principal associate, Douglas-fir, in lumber trade practice. However, differences between the two species are becoming more important

both to timber management and marketing. Larch timber is cut mainly for lumber, but it is also a fine veneer wood and is used extensively for utility poles, pulpwood, railroad ties, and mine timbers. Its clean-boled form and strength—it is the strongest of Idaho's softwoods—are special assets for these uses. In 1956, 6 percent of the pulpwood produced in Idaho was larch and nearly one-fourth of all utility poles produced in the Inland Empire between 1947 and 1956 were of this species.

Western larch is unique in wood chemistry among softwoods as a source of arabogalactan, a wood sugar, that can be used in manufacturing baking powder and other products. The gum from which arabogalactan is derived is often concentrated in the butt logs of larch trees in quantities sufficient to make that part of the tree unsuitable for lumber. Research is in progress to develop pharmaceutical products from arabogalactan; this would turn a present economic liability into an asset.⁸

⁸ Washington State Institute of Technology, News Items 4(1): 1-2, February 1960.



Lodgepole Pine

AREA of the lodgepole pine type (thousands of acres):

	State	Northern	Southern
Sawtimber stands	480	106	374
Poletimber stands	1,837	645	1,192
Seedling-sapling stands	539	365	174
Nonstocked and deforested	142	93	49
Total	2,998	1,209	1,789

VOLUME of lodgepole pine timber (billions):

Sawtimber (board feet)	4.8	1.2	3.6
Growing stock (cubic feet)	3.7	1.2	2.5

In Idaho, the LODGEPOLE PINE type is second only to the Douglas-fir type in area. It is the only one of the six types discussed here that has its greatest acreage in poletimber stands rather than in sawtimber stands. However, much of the poletimber is mature.

The inland or mountain form of lodgepole pine (the form that grows in Idaho) is typically small in diameter but relatively tall and straight of stem. Even so, the species produces considerable sawtimber, as the 4.8 billion board feet in Idaho's forests attest.

Use of lodgepole pine for lumber has been very limited, but records show that some lodgepole pine lumber has been sawed each year since 1909. In round form, lodgepole pine has had considerable use on farms in southern Idaho; it was also a major source of ties 25 to 40 years ago.

Idaho has vast areas of pure, practically untouched, lodgepole pine stands, mainly because the State's timber industry has been largely based on lumber production, for which larger tree species have always been available. In recent years, improved procedures for handling small logs and other factors have combined to increase the output of lodgepole pine lumber. In 1948, only 5.2 million board feet of lumber were produced from the species, but lumber production was 18.4 million board feet in 1954, and in 1956 was 13.5 million board feet.

Lodgepole pine probably has as great potentialities for pulpwood as any species in the State. For this use, the tree's small size is no disadvantage, and the extensive pure stands form a large reserve. About 3,000 cords of lodgepole pine were harvested for pulpwood in 1952. By 1956, rail shipments to the Lake States region from southeastern Idaho had swelled to more than 23,000 cords and more than 25,000 cords were shipped in 1959. Since 1959, shipments have declined.

Lodgepole pine makes excellent commercial poles, especially in the smaller sizes. Its straight stem, gradual taper, and ready absorption of preservatives are all assets for this use. Available records indicate peak production of lodgepole pine poles in northern Idaho probably occurred in 1946 with an output of 37,100 poles when the Rural Electrification Administration program was in full swing. By 1950, northern Idaho production of commercial lodgepole pine poles had practically ceased, largely because of the continued availability of the favored western redcedar and the reduced demand for smaller sizes of poles in rural power and telephone line construction. All pole production from southern Idaho has been of lodgepole pine and has averaged about 8,000 poles annually for the past several years.

TIMBER GROWTH

- For the 1947-54 period, the net annual growth on sawtimber trees was 1,646 million board feet, a net annual increase of 1.4 percent.⁹ For all commercial forest land in Idaho this was only 104 board feet per acre per year, but the average was considerably higher when related only to sawtimber trees in sawtimber stands. It is estimated that the average sawtimber stand in Idaho added a net volume of about 180 board feet per acre annually during the survey period.
- The net annual growth of growing stock trees (1947-54) was 469 million cubic feet, a net annual increase of 1.8 percent. For all commercial forest land, cubic volume increment was nearly 30 cubic feet per acre per year.

Northern Idaho's net growth rate of 36 cubic feet per acre per year was 50 percent higher than southern Idaho's 24 cubic feet per acre. Differences in the average productivity of forest land in the two subunits were probably the main reason for this.

⁹ These growth levels are strongly influenced by the low growth rates characteristic of the large areas of old-growth timber still remaining in Idaho. Because of this, they do not afford meaningful bases for decisions on allowable timber cutting levels or for estimating the potential productivity of the State's commercial forest land.

- An average of 608 million board feet of sawtimber was lost annually to insects, diseases, and other forms of attrition. Although this loss totaled nearly the same in both subunits (296 million board feet and 312 million board feet, respectively, for northern and southern Idaho), it was proportionately more severe in southern Idaho where the volume of live sawtimber is less.

Practically all mortality of sawtimber trees (91 percent) occurred in sawtimber stands. In such stands the average annual loss was more than 63 board feet per acre per year.

Nearly two-thirds of all sawtimber mortality occurred in Douglas-fir and the true firs, although together they comprise slightly less than half of the sawtimber volume. Only western hemlock and lodgepole pine had higher loss percentages than Douglas-fir and the true firs.

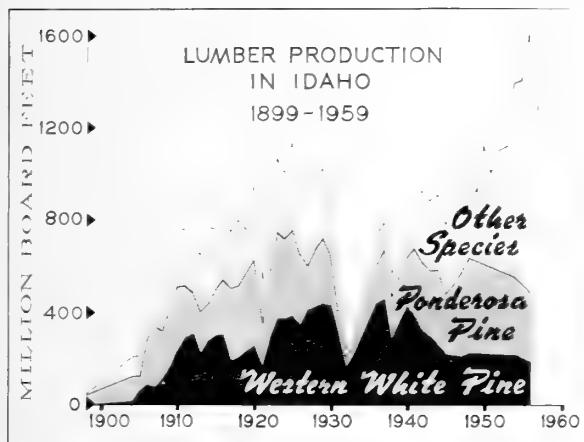
- Mortality losses in growing stock averaged 147 million cubic feet per year for the survey period. Sixty percent of the annual loss occurred in southern Idaho's timber stands, although these stands contain somewhat less than half of the State's growing stock volume.

Annual growth and mortality of sawtimber and growing stock by species

Species	Sawtimber			Growing stock		
	Gross	Net	Gross	Net		
	growth	Mortality	growth	Mortality	growth	
<i>Million board feet</i>						
Douglas-fir	698	253	445	165	48	117
True firs	522	133	389	124	31	93
Ponderosa pine	269	46	223	51	10	41
Western white pine	236	34	202	51	7	44
Spruce	169	35	134	38	6	32
Lodgepole pine	139	42	97	112	32	80
Other	221	65	156	75	13	62
Total	2,254	608	1,646	616	147	469

PRODUCTION AND TRENDS

Logs for lumber, pulpwood, and utility poles have been the principal products cut from Idaho timber in recent years. However, sawlogs for lumber have been by far the most important product, making up about 95 percent of the total production. Lumber output has been



increasing rapidly since the middle 1930's. In 1947, for example, 951 million board feet (7) were produced by local mills. Between then and 1959 lumber output nearly doubled.

Volume of timber cut¹ for primary products from sawtimber and growing stock, 1956

Product	Sawtimber		Growing Stock	
	Million Board Feet	Percent	Million Cubic Feet	Percent
Sawlogs ²	1,830	96.1	305	94.3
Pulpwood logs	52	2.7	8	2.6
Pulpwood bolts	6	.3	2	.6
Poles	6	.3	3	.9
Fuelwood	5	.3	2	.6
Other ³	6	.3	3	1.0
Total	1,905	100.0	323	100.0

¹ Logging residues for 1956 were estimated to be 85 million board feet for the total sawtimber cut and 32 million cubic feet for the total cut from growing stock.

² Practically all sawlogs were for lumber, but these figures also include veneer logs.

³ Includes mine timbers, shingle logs and bolts, posts, and miscellaneous farm timbers.

- During the period 1947-54 the timber cut from sawtimber for all products averaged 1.3 billion board feet.¹⁰ In 1956, 1.9 billion board feet were cut; fragmentary data (15) indicate that this record high was surpassed in 1959.

- Depending upon the formulae used and the assumptions made with each, estimates for the allowable annual cut (see definitions) for the State range from 2.0 to 2.5 billion board feet. These estimates are based on existing forest conditions—which in Idaho means that they are strongly influenced by the high proportion of decadent old-growth timber and large amounts of nonstocked forest land.

Comparison of sawtimber cut with allowable cut estimates indicates that up to and through the 1947-54 period the State's timber capital as a whole was not depleted by cutting. This inference is supported also by comparison of timber cut volumes with the net annual growth rate; this shows that prior to 1955 the annual sawtimber cut was more than replaced by the net annual growth of sawtimber. By 1959, a timber cut estimated at 2.1 billion board feet was reached—a point within the allowable cut range and considerably above the Forest Survey's estimate of net annual growth.

Unit	Net annual sawtimber growth and sawtimber cut for selected years, 1946-56, by State subunits					
	Net annual growth	Total sawtimber cut				
		1946	1948	1950	1952	1954
State	1,646	970	—	—	1,300	1,590
Northern	959	740	880	1,020	1,070	—
Southern	687	230	—	—	230	—
						335

¹⁰ Bases for estimates: Northern Rocky Mountain Forest and Range Experiment Station file records of sawmill log receipts and lumber production for 1946, 1948, and 1950; also NRM Station Paper 35 and Research Note 136; Intermountain Forest and Range Experiment Station file data prepared for U.S.F.S. Forest Resource Report No. 14, also Research Note 54; Bureau of the Census 1947 and 1954 Censuses of Manufactures (Lumber and Timber Basic Products).

- Northern Idaho, with 53 percent of the sawtimber, has provided most of the timber cut (more than 82 percent of the 1956 total) but her annual cut from sawtimber did not reach the lower estimate of allowable cut for the sub-unit (1.1 billion board feet) until about 1952; the upper estimate of 1.4 billion board feet was reached about 1955. Southern Idaho's sawtimber cut in 1956 (335 million board feet) was less than half of the estimated allowable cut of 0.7 billion board feet.

- Much that has been said about the distribution of the sawtimber cut applies as well to the timber cut from all growing stock. For the field inventory period (1947-54), the average annual cut of growing stock was about 220 million cubic feet. The cut for 1954 is estimated to have been about 281 million cubic feet; in 1956 it rose to 323 million cubic feet.

These timber cut estimates are markedly below the Forest Survey estimate of 469 million cubic feet for the net annual growth rate for trees 5.0 inches d.b.h. and larger. This difference comes about because of the growth being added to great numbers of small trees and because Idaho has practically no markets for wood from small trees. Evidently a great potential supply of raw material in small trees awaits the development of such markets.

- The pattern of timber cutting between private and public forest land ownerships (principally national forests) is changing. National forests contain more than two-thirds of the volume in sawtimber trees and, at the start of the inventory period, were supplying one-fourth of the total timber cut. By 1956, private lands were still supplying most of the cut but the national forests' share had risen to 38 percent. It is estimated that 40 to 50 percent of Idaho's cut of sawtimber in 1959 came from national forests.

Much of the responsibility for future development of the State's forests rests upon the national forests. Since they cover 71 percent of the commercial forest land, increasingly larger shares of Idaho's timber cut must come from these lands. This prospect has been recognized

for some time (not only in Idaho) and is a basic premise of the Forest Service's "Program for the National Forests" (18). The cut from national forests has been increased substantially, but the principal deterrent to more rapid increases has been, and is, the combined difficulty and cost of constructing adequate access roads in rugged topography.

- The cut from several of Idaho's timber species has shifted significantly in the last two decades. The principal changes have involved western white pine, ponderosa pine, Douglas-fir, Engelmann spruce, and the true firs. Two of these—western white pine and ponderosa pine—have carried a disproportionately large share of the lumber cut during most of Idaho's history. From 1913 to 1940 more than 40 percent of the State's lumber output was western white pine. Ponderosa pine has never been cut as heavily as white pine but, between 1900 and the late 1940's, 25 to 40 percent of the total cut was ponderosa pine. The accumulated pressures of this heavy cutting, aggravated by losses to fire, insects, and diseases were undoubtedly largely responsible for the downward adjustments in lumber output for these species after 1940. By 1956, the cut from each was nearly proportional to its percentage of all sawtimber volume.

Percentages of sawtimber board-foot volume and sawtimber cut by species for selected years, 1946-56

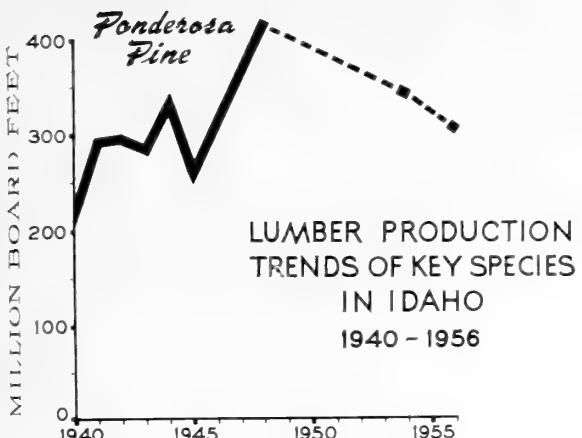
Species	Percent of sawtimber board-foot volume	Percent of sawtimber cut		
		1946	1946-54 average ¹	1956
Western white pine	12	30	22	14
Ponderosa pine	17	32	25	18
Douglas-fir	32	15	² 29	24
Western larch	5	9		8
True firs ³	17	10	12	18
Engelmann spruce	8	1	8	12
Other	9	3	4	6
Total	100	100	100	100
Total volume ⁴	114,954	970	1,285	1,905

¹ Average for 1946, 1952, and 1954 cut for western white pine, ponderosa pine, and Douglas-fir—larch; average of 1946 and 1954 cut for other species.

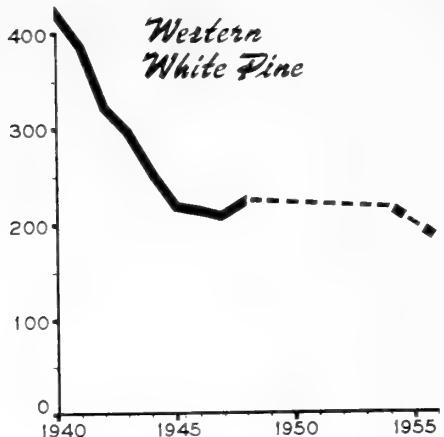
² Data for Douglas-fir and western larch not separable for 1952 and 1954.

³ Grand, white, and subalpine firs.

⁴ Millions of board feet, International $\frac{1}{4}$ -inch rule.



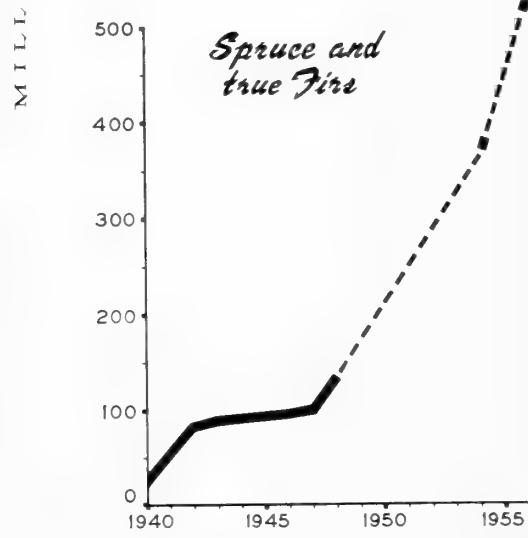
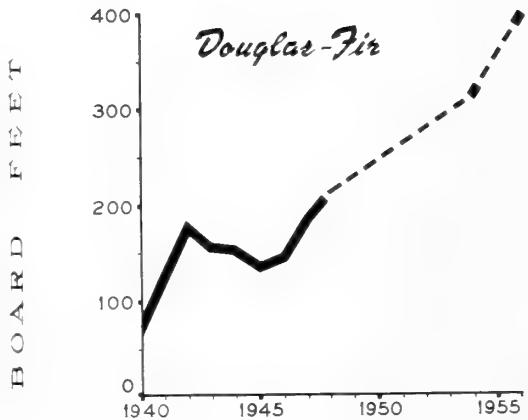
LUMBER PRODUCTION
TRENDS OF KEY SPECIES
IN IDAHO
1940 - 1956



Despite declines in production of these major species, total lumber output increased from 780 million board feet to 1,609 million board feet between 1945 and 1956, and reached 1,802 million board feet in 1959. Achievement of this spectacular increase required remarkable gains from other species, notably Douglas-fir, Engelmann spruce, and the true firs—species whose cutting rates had been comparatively low. Although the cut from spruce during this period was boosted by the bark-beetle salvage and sales program, it appears now that spruce has gained a solid place in the lumber markets.

The acceptance of the so-called "associated" species has helped to take some of the pressure off of western white pine and ponderosa pine and has distributed the cut among the State's timber species more in line with their respective percentages of total sawtimber volume than it had been in the 1940's and earlier. This trend has implications for both timber management and forest industry. It frees industry from dependence upon a few key species and, by broadening potential supplies, provides room for industry expansion. For the forest manager it helps solve the problem of an outlet for the associated species and increases his opportunities for choosing among management alternatives.

- The rapid increase in timber cutting over the past several years indicates the overall growth and widened markets for Idaho's forest indus-



tries. In connection with this increase there were several significant changes: (a) sawmills became fewer but larger; (b) forest industries began to diversify—Idaho's first pulp mills, veneer plants, and particle board plant came into existence after 1947; (c) new supply sources were opened up — the production of pulpwood and commercial poles from southeastern Idaho, for example. The use of chipped sawmill residues for pulpwood was also a development with significance for both wood utilization and timber management.

Since 1947, the trend toward fewer but larger sawmills in Idaho has been noticeable. In 1947, 388 operating mills had an average annual lumber production of 2.45 million board feet. By 1956, active mills numbered 311 and output averaged 5.17 million board feet. Seventeen were producing at the rate of 10 million board feet or more per year in 1947, but there were 37 such mills in 1956.

In 1947, Idaho had no veneer plants, but one was under construction soon after. By 1955, there were two such plants—both in northern Idaho and both operated in connection with sawmills—to provide a higher level of utilization for the better quality logs of western white pine, ponderosa pine, western redcedar, and western larch.

Idaho had no pulp mills in 1947, but in 1950, the first of two Potlatch Forests, Inc. pulp units began producing at Lewiston. The second unit went into production in 1958.

Pulpwood production increased from about 39,000 cords in 1948 (1) to nearly 96,000 cords by 1954 (20). Part of this increase was due to new markets in the Lake States region that began to take pulpwood from southeastern Idaho in 1953. This was an especially encouraging development for timber management in this area because it permitted a start toward inten-

sified management of the extensive, but previously bypassed, stands of lodgepole pine. By 1956, output for the State had jumped to more than 227,000 cords—an increase of 137 percent over 1954 production (24). Production from roundwood has since declined from the 1956 level, but how much of the decline is due to temporary economic conditions and how much is due to shifts to chipped sawmill residues cannot be determined from present information.

Use of chipped sawmill residues for pulping started after the 1947-54 inventory period and has grown rapidly. About two-thirds of the pulpwood receipts of the Potlatch units are chipped residues,¹¹ and some southern Idaho sawmills are supplying chips to the Boise Cascade Kraft Corporation plant in southeastern Washington.

Idaho's single particle board plant—the only one in the Mountain States—has been operating since 1955. Particle board plants use sawmill residues for raw material and can be operated efficiently at lower supply levels than pulp mills.

Although some poles have been produced in southern Idaho for a number of years, Idaho's commercial pole industry is centered in the northern subunit. Northern Idaho is a leading production area for the highly regarded western redcedar utility poles and produces a considerable number of western larch poles. Two other species that afford an abundant potential source of poles, Douglas-fir and lodgepole pine, are still practically untouched. Southern Idaho's extensive lodgepole pine stands supply about 8,000 poles a year—the merest hint of their potential output.

¹¹ Western Conservation Journal 16(6). 1959

Lumber production by sawmill size classes, 1947 and 1956

Sawmill size class (M bd. ft. per year)	1947		1956	
	Active sawmills	Lumber production	Active sawmills	Lumber production
	Number	Percent	Number	Percent
Less than 500	237	3	139	1
500 to 999	51	4	27	1
1,000 to 4,999	61	15	80	13
5,000 to 9,999	22	16	28	12
10,000 and over	17	62	37	73
Total	388	100	311	100

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APPENDIX

TERMINOLOGY

Forest Land

Forest land includes (a) land that is at least 10-percent stocked by trees of any size and capable of producing timber or other wood products, or of exerting an influence on the climate or on the water regime; (b) land from which the trees described in (a) have been removed to less than 10-percent stocking and which has not been developed for other use; (c) afforested areas.

At the time the field work for this report was performed, the minimum area for forest land classification was 10 acres with a minimum width of 120 feet.

The principal classes of forest land are:

Commercial forest land: Forest land that is (a) producing, or is physically capable of producing, usable crops of wood (usually sawtimber), (b) is economically available now or prospectively, and (c) is not withdrawn from timber utilization.

Noncommercial forest land: Forest land that is (a) withdrawn from timber utilization through statute, ordinance, or administrative order but otherwise qualifies as commercial forest land; and (b) is incapable of yielding usable wood products (usually sawtimber) because of adverse site conditions, or is so physically inaccessible as to be unavailable economically in the foreseeable future.

Forest Types

Western white pine: During the period of field work for this report (1947-51 in northern Idaho, where all of Idaho's western white pine occurs), the western white pine type included forests in which 20 percent or more of the stand was western white pine.

Western redcedar

Ponderosa pine

Western larch

Douglas-fir

Hemlock

Lodgepole pine

Whitebark and limber pine

Engelmann spruce

Grand fir

Subalpine fir

Forests in which 50 percent or more of the stand is in the species for which the type is named and less than 20 percent of the stand is western white pine.

Hardwoods: Forests in which 50 percent or more of the stand is aspen, cottonwood, or other western hardwood species, and less than 20 percent of the stand is western white pine.

Tree Classes

Sawtimber trees: Trees of commercial species that contain at least one merchantable 16-foot sawlog and are 11.0 inches or larger in diameter at breast height (d.b.h.).

Poletimber trees: Trees of commercial species that are 5.0 inches d.b.h. or larger and meet regional specifications for soundness and form but do not meet the specifications for sawtimber trees.

Seedling and sapling trees: Trees of commercial species that are smaller than 5.0 inches d.b.h.

Growing stock trees: Sawtimber trees, poletimber trees, saplings, and seedlings, i.e., all live trees except cull trees.

Note: In discussion and tables on volumes, growth, and mortality, the term *growing stock* refers only to sawtimber trees and poletimber trees, i.e., all trees 5.0 inches d.b.h. and larger (except cull trees). Saplings and seedlings are not part of growing stock in this usage of the term.

Cull trees: Live trees of sawtimber or pole-timber size that are unmerchantable for sawlogs now or prospectively because of defect, rot, or species. *Rotten cull trees* fail to meet regional specifications for the proportion of sound volume to total volume. *Sound cull trees* do meet regional specifications for freedom from rot but cannot produce even one merchantable sawlog, now or prospectively (according to regional specifications) because of roughness, poor form, or species.

Stand-size Classes

Sawtimber stands have a minimum net volume per acre of 1,500 board feet, International $\frac{1}{4}$ -inch rule.

Poletimber stands fail to meet the sawtimber stand specification, but are at least 10-percent stocked with poletimber and larger (5.0 inches d.b.h. and larger) trees and have at least half the minimum stocking in poletimber trees.

Seedling and sapling stands do not qualify as either sawtimber or poletimber stands, but have at least 10-percent stocking of trees of commercial species and have at least half the minimum stocking in seedling and sapling trees.

Nonstocked areas are areas that do not qualify as sawtimber, poletimber, or seedling and sapling stands.

Stocking

Stocking refers to the extent to which growing space is effectively utilized by present or potential growing stock trees of commercial species. *Degree of stocking* is synonymous with *percent of growing space occupied* and means the ratio of actual stocking to full stocking for comparable sites and stands. In this report it is expressed as the percentage of the available space occupied by tree crowns.

Well-stocked stands have 70-percent or more coverage by tree crowns.

Medium-stocked stands have 40- to 70-percent coverage by tree crowns.

Poorly stocked stands have 10- to 40-percent coverage by tree crowns.

Nonstocked areas are less than 10-percent stocked with present or potential growing stock trees.

Volume

All-timber volume: Net volume in cubic feet of live and salvable dead sawtimber trees and poletimber trees of commercial species, and cull trees of all species, from stump to a minimum 4.0-inch top inside bark. Includes bole only of softwoods but both bole and limbs of hardwoods to a minimum 4.0-inch diameter inside bark.

Growing stock volume: Net volume in cubic feet of live sawtimber trees and live poletimber trees from stump to a minimum 4.0-inch top (of central stem) inside bark.

Live sawtimber volume: Net volume in board feet, International $\frac{1}{4}$ -inch rule, of live sawtimber trees.

Growth

Net annual growth of sawtimber: The average annual change, calculated from the total change over a 10-year period, in net board-foot volume of live sawtimber on commercial forest land resulting from natural causes exclusive of catastrophic losses.

Net annual growth of growing stock: The average annual change, calculated from the total change over a 10-year period, in net cubic-foot volume of growing stock on commercial forest land resulting from natural causes exclusive of catastrophic losses.

Mortality

Net annual mortality of sawtimber or growing stock: The average annual net board-foot or cubic-foot volume removed from live sawtimber or growing stock through death from natural causes, calculated from the total net volume removed by such causes over a 10-year period.

Timber Cut

Timber cut from growing stock: The volume of sound wood in live sawtimber and pole-timber trees cut for forest products during a specified period, including both roundwood products and logging residues.

Timber cut from sawtimber: The net board-foot volume of live sawtimber trees cut for forest products during a specified period, including both roundwood products and logging residues.

Logging residues from growing stock: The net cubic-foot volume of live sawtimber and pole-timber trees cut or killed by logging on commercial forest land and not converted to timber products.

Allowable cut: The volume of timber that would be cut on commercial forest land during a given period under specified management plans for sustained production, such as those in effect on national forests.

Principal Tree Species

a. Softwoods

Douglas-fir	<i>Pseudotsuga menziesii</i>
Fir, subalpine	<i>Abies lasiocarpa</i>
Fir, grand	<i>A. grandis</i>
Fir, white	<i>A. concolor</i>
Hemlock, mountain	<i>Tsuga mertensiana</i>
Hemlock, western	<i>T. heterophylla</i>
Larch, western	<i>Larix occidentalis</i>
Pine, limber	<i>Pinus flexilis</i>
Pine, lodgepole	<i>P. contorta</i>
Pine, ponderosa	<i>P. ponderosa</i>
Pine, western white	<i>P. monticola</i>
Pine, whitebark	<i>P. albicaulis</i>
Redcedar, western	<i>Thuja plicata</i>
Spruce, Engelmann	<i>Picea engelmannii</i>

b. Hardwoods

Aspen, quaking	<i>Populus tremuloides</i>
Cottonwood, black	<i>P. trichocarpa</i>
Birch, paper	<i>Betula papyrifera</i>

FOREST SURVEY PROCEDURES

Inventory

In the initial Forest Survey of northern Idaho, made between 1932 and 1937, forest and nonforest land boundaries were delineated on base maps from cruise data, county assessment records, cutting and fire records, and other available sources. Forest land was further delineated by type, stand-size, stocking, age, and site classes. Additional stand characteristics such as age were determined by field checking. The area in each cover class was determined from the maps and summarized by types, stand-size classes, stocking classes, age classes, and site classes for each ownership class and county. Timber volume was estimated for each delineated forest land subdivision from cruise data, field samples, and normal yield data correlated with type, stocking, age, and site classes.

The second survey of northern Idaho, which furnished data for this report, was made between 1947 and 1951 and used sampling procedures to obtain adjustment factors for updating the initial survey data. Except in Idaho and Benewah Counties, the areas of forest and nonforest land (and the subclasses of forest land) were obtained by correlating initial survey classifications with field data from sample transects (strips). These transects were taken in the vicinity of Land Office section corners spaced at 4-mile intervals. Groups of three 1/5-acre plots at each of these Land Office section corners supplied volume data. Since Benewah County had been resurveyed in 1943-44, a 6-year adjustment for cutting and growth was applied to the resurvey data to update Benewah County statistics. In the second survey of Idaho County, a new cover type map was made by field use of aerial photographs, and volume estimates were obtained from plots near section corners on a 4-mile grid spacing as was done in most of the northern Idaho counties, except that two, instead

of three, grouped 1 5-acre plots were used. Aerial photographs were used principally as aids in finding the selected section corners and to provide a record for future reexamination of the field locations.

Data for southern Idaho for this report were obtained from joint Forest Survey and national forest timber management surveys conducted between 1950 and 1954. This was the initial inventory survey of the southern subunit of the State. For the central and southeastern portion of the subunit (from the Salmon and Challis National Forests east), the 4-mile grid pattern as used in northern Idaho was applied with three principal exceptions: (a) transects were not used, (b) a "location" (cluster of plots) consisted of two plots rather than three, and (c) aerial photographs were used in preliminary and field type mapping as well as for finding section corners, and as a location record. In southwestern Idaho, however, the national forest timber management survey of the Boise, Payette, and part of the Sawtooth National Forests was a separate project where techniques that had not previously been used in Idaho were applied. Locations consisted of clusters of two or three ground plots, as elsewhere in Idaho, but were distributed randomly instead of systematically; this was later modified to stratified random sampling, with heaviest sampling in the economically most important forest types and stand-size classes. More intensive use of experienced photo interpreters was also made in delineating forest types on photographs than had been done previously in Idaho.

Growth and mortality data were obtained on the field plots. For growth rates, increment borings were made in sample trees to determine radial growth for the 10-year period preceding the plot examination; the radial growth measurements were then translated into average annual volume growth. Mortality data were derived from a tally of dead trees on the field

plots. Ten-year mortality estimates were used with the 10-year growth measurements to provide an average annual net growth estimate.

Timber Cut

Estimation of timber cut may be based on output data for a single year if that year is considered to be typical of the period during which the Forest Survey was conducted. Average primary product output and average logging residues figures based on periodic surveys of the forest industries are usually preferable. Lumber industry surveys, conducted in cooperation with the Bureau of the Census, provide both lumber production and log receipts data for estimating the predominant part of the timber cut. Periodic surveys are also conducted to determine the output of pulpwood, commercial poles, fuelwood, mine timbers, posts, and miscellaneous timbers of lesser importance. Data for estimating the volume of logging residues are obtained by special studies on active woods operations.

Accuracy of Estimates

Statistical analysis of area and volume data for each State subunit and for the State as a whole provide the following data for sampling errors:¹²

¹² At one standard deviation. At this level, chances are two out of three that the results obtained do not differ from the results that would have been obtained by 100-percent coverage by more than the percentage shown.

Unit	All forest land		Commercial forest land		Noncommercial forest land		Growing stock volume	
	Thousand acres	Percent	Thousand acres	Percent	Thousand acres	Percent	Million cu. ft.	Percent
Northern Idaho	±116	±1.1	± 78	±1.0	± 86	±3.5	±233	±1.8
Southern Idaho	±140	±1.2	±114	±1.3	± 82	±2.3	±230	±1.8
Idaho	±182	± .8	±138	± .9	±118	±2.0	±327	±1.3

Sampling errors are inherent in the process of estimating a total from a sample fraction of the total and, as such, can be evaluated mathematically. Estimates of sampling error, however, do not include errors that arise from mistakes in judgment, measurement, recording, transcribing, faulty equipment, and similar sources. Careful training in and close supervision of all phases of field and office work are employed to keep these reporting errors to a minimum.

Since the estimation of timber cut requires combining data from a number of independent surveys, no comprehensive sampling error for total timber cut can be computed. However, since lumber production in Idaho accounts for about 94 percent of the total timber cut, the sampling errors for the lumber production and sawlog receipts surveys for 1956 (22, 23) are indicative of the timber cut sampling error. The sampling error for 1956 lumber production in Idaho was 0.86 percent and the sampling error for sawlog receipts was 0.92 percent, at one standard deviation.

APPENDIX TABLES

I. Standard Summary Tables (Nos. 1-10)

Table 1.—Land area by major classes of land,
Idaho, 1954

Class of land	Area <i>Thousand acres</i>
Forest:	
Commercial	15,823
Noncommercial:	
Productive-reserved	1,867
Unproductive ¹	4,125
Total	21,815
Nonforest: ²	31,157
Total, all classes	52,972

¹ Includes 971,000 acres withdrawn for special uses.

² Includes 67,000 acres of water according to survey standards of area classification but defined by the Bureau of the Census as land.

Table 3.—Area of commercial forest land, by major forest types, Idaho, 1954

Forest type	Area <i>Thousand acres</i>
Douglas-fir	4,798
Hemlock	167
Ponderosa pine	2,624
Western white pine ¹	2,178
Lodgepole pine ²	3,023
Larch	730
Spruce-fir	1,755
Hardwoods	548
Total, all types	15,823

¹ Includes 258,000 acres of western red-cedar type.

² Includes 25,000 acres of whitebark and limber pine types.

Table 2.—Commercial forest land area, by ownership and stand-size classes, Idaho, 1954

Ownership class	Total	Sawtimber stands	Pole-timber stands	Seedling and sapling stands	Non-stocked and other areas ¹
<i>Thousand acres</i>					
Federally owned or managed:					
National forest	11,310	6,380	2,845	1,022	1,063
Indian	102	45	30	12	15
Bureau of Land Mgmt.	404	204	123	36	41
Other	1	1	(²)	(²)	(²)
Total	11,817	6,630	2,998	1,070	1,119
State:	940	593	171	96	80
Private: ²					
Farm	1,229	436	491	179	123
Industrial & other	1,837	1,082	251	253	251
Total	3,066	1,518	742	432	374
Total, all ownerships	15,823	8,741	3,911	1,598	1,573

¹ Includes areas not classified elsewhere.

² Less than 0.5 thousand acres.

³ Includes a negligible amount of county and municipal ownership.

Table 4.—Net volume of live sawtimber and growing stock on commercial forest land by stand-size class, Idaho, 1954

Stand-size class	Sawtimber	Growing stock
	<i>Million bd.-ft.¹</i>	<i>Million cu. ft.</i>
Sawtimber stands	109,785	20,952
Poletimber stands	4,521	4,661
Seedling-sapling stands	356	264
Nonstocked and other areas not elsewhere classified	292	68
Total, all stands	114,954	25,945

¹ International $\frac{1}{4}$ -inch log rule.

Table 5.—Net volume of live sawtimber and growing stock on commercial forest land by ownership class, Idaho, 1954

Ownership class	Sawtimber	Growing stock
	<i>Million bd.-ft.¹</i>	<i>Million cu. ft.</i>
Federally owned or managed:		
National forest	80,532	18,531
Indian	388	104
Bureau of Land Mgmt.	2,158	545
Other	2	1
Total	83,080	19,181
State	9,433	1,915
Private: ²		
Farm	5,860	1,485
Industrial & other	16,581	3,364
Total	22,441	4,849
Total, all ownerships	114,954	25,945

¹ International $\frac{1}{4}$ -inch log rule.

² Includes a negligible volume in county and municipal ownership.

Table 6.—Net volume of live sawtimber and growing stock on commercial forest land, by species, Idaho, 1954

Species	Sawtimber	Growing stock
	<i>Million bd.-ft.¹</i>	<i>Million cu. ft.</i>
Softwoods:		
Douglas-fir	36,587	7,665
Ponderosa pine	19,297	3,236
True firs ²	19,214	4,223
Western hemlock	2,113	488
Western white pine	13,381	2,389
Engelmann spruce	9,635	1,790
Western larch	6,110	1,333
Western redcedar	3,098	740
Lodgepole pine	4,816	3,694
Other softwoods	387	134
Total	114,638	25,692
Hardwoods:		
Aspen	75	189
Other hardwoods	241	64
Total	316	253
Total, all species	114,954	25,945

¹ International $\frac{1}{4}$ -inch log rule.

² Grand, subalpine, and white firs.

Table 7.—Net volume of live sawtimber on commercial forest land by diameter class groups and species, Idaho, 1954

Species	Diameter class groups (inches)				Total
	11.0-20.9	21.0-30.9	31.0-40.9	41.0 & larger	
<i>Softwoods:</i>					
Douglas-fir	18,560	12,654	4,026	1,347	36,587
Ponderosa pine	4,325	7,124	5,953	1,895	19,297
True firs ²	11,721	5,815	1,450	228	19,214
Western hemlock	1,544	542	27	0	2,113
Western white pine	7,015	4,182	1,425	759	13,381
Engelmann spruce	4,416	4,084	1,014	121	9,635
Western larch	3,203	1,852	931	124	6,110
Western redcedar	1,682	990	320	106	3,098
Lodgepole pine	4,647	169	0	0	4,816
Other softwoods	304	55	28	0	387
Total	57,417	37,467	15,174	4,580	114,638
<i>Hardwoods:</i>					
Aspen	75	0	0	0	75
Other hardwoods	169	63	9	0	241
Total	244	63	9	0	316
Total, all species	57,661	37,530	15,183	4,580	114,954

¹ International $\frac{1}{4}$ -inch log rule.

² Grand, subalpine, and white firs.

Table 8.—Net volume of all timber on commercial forest land, by class of material and species group, Idaho, 1954

Class of material	Total	Softwoods	Hardwoods			
		<i>Million cubic feet</i>				
<i>Growing stock:</i>						
<i>Sawtimber trees:</i>						
Sawlog portion	16,775	16,730	45			
Upper stem portion	2,084	2,068	16			
Total	18,859	18,798	61			
<i>Poletimber trees:</i>	7,086	6,894	192			
Total, growing stock	25,945	25,692	253			
<i>Other material:</i>						
Sound cull trees	493	484	9			
Rotten cull trees	1,843	1,826	17			
Hardwood limbs	1	0	1			
Salvable dead trees	1,614	1,610	4			
Total, other material	3,951	3,920	31			
Total, all timber	29,896	29,612	284			

Table 9.—Net annual growth, annual mortality, and annual cut of live sawtimber and growing stock on commercial forest land, by species groups, Idaho¹

Item	Sawtimber			Growing stock		
	Total	Softwoods	Hardwoods	Total	Softwoods	Hardwoods
	<i>Million board feet²</i>					
Net annual growth	1,646	1,636	10	469	460	9
Annual mortality	608	605	3	147	145	2
Annual cut: ³						
Timber products	1,237	1,236	1	198	198	(4)
Logging residues	58	58	(4)	22	22	(4)
Total	1,295	1,294	1	220	220	(4)

¹ Data for growth and mortality as of 1954, timber cut data are averages computed for the 1947-54 period. (See footnote 3)

² International $\frac{1}{4}$ -inch log rule.

³ Bases for estimates: former Northern Rocky Mountain Forest and Range Expt. Station file records of sawmill log receipts and lumber production for 1946, 1948, and 1950; also Northern Rocky Mountain Station Paper 35; 1952 data of NRM Research Note 136, and Intermountain Forest and Range Experiment Station file data prepared for U.S.F.S. Forest Resource Report No. 14; 1956 data of IF&RES Research Note 54; and the Census Bureau's 1954 Census of Manufactures (Lumber and Timber Basic Products).

⁴ Less than 0.5 million feet.

Table 10.—Output of timber products and annual cut of live sawtimber and growing stock, Idaho, 1956

Product	Output of timber products				Annual cut of sawtimber ¹			Annual cut of growing stock ¹		
	Volume in standard units		Roundwood volume		Total	Softwoods	Hardwoods	Total	Softwoods	Hardwoods
	Standard units	Number	Total	Softwoods	Hardwoods	M board-feet ²	M board-feet ²	M board-feet ²	M cubic feet	M cubic feet
Sawlogs										
Veneer logs and bolts	M bd. ft. ²	1,873,700	274,676	274,645	31	1,830,400	1,830,061	339	304,890	304,856
Pulpwood logs	"	91,256	13,436	13,329	107	51,740	50,612	1,128	8,482	8,297
Pulpwood bolts	Std. cords ³	423,317	2,005	2,005	0	6,062	6,062	0	2,005	2,005
Fuelwood	"	5414,389	31,908	31,725	183	5,403	5,372	31	1,861	1,850
Poles	M pieces	143	2,579	2,579	0	6,077	6,077	0	3,038	3,038
Posts	"	742	602	602	0	644	644	0	315	315
Mine timbers	M cu. ft.	1,443	1,443	1,443	0	3,746	3,746	0	1,563	1,563
Miscellaneous ⁶	"	71,258	1,258	1,258	0	1,196	1,196	0	1,199	1,199
Total			327,907	327,586	321	1,905,268	1,903,770	1,498	323,353	323,123
										230

¹ Logging residues for 1956 estimated at 85 million board feet for the total sawtimber cut and 32 million cubic feet for the total cut from growing stock.

² International $\frac{1}{4}$ -inch rule.

³ Rough wood basis.

⁴ Not including mill residues used for pulp and hardboards.

⁵ Not including mill residues used for domestic and industrial fuel.

⁶ Includes shingle bolts, farm timbers, etc.

⁷ Not including mill residues used for miscellaneous products.

II. Supplementary Tables (Nos. 11-27)

Table 11.—Land area, by major land classes and State subunits, Idaho, 1954

Land Class	State		Northern	Southern
	Thousand acres	Percent	Thousand acres	
Forest:				
Commercial	15,823	29.9	7,760	8,063
Noncommercial:				
Productive-reserved	1,867	3.5	932	935
Unproductive	4,125	7.8	1,534	2,591
Total	21,815		10,226	11,589
Nonforest ¹	31,157	58.8	2,341	28,816
Total, all classes ²	52,972	100.0	12,567	40,405

¹ Includes 67,000 acres of water according to Survey standards of area classification, but defined by the Bureau of Census as land.

² From U.S. Bureau of Census: Land and Water Area of the United States, 1950.

Table 12.—Commercial forest land area, by ownership classes and State subunits, Idaho, 1954

Ownership class	State		Northern	Southern
	Thousand acres	Percent	Thousand acres	
Federally owned or managed:				
National forest	11,310	71.5	4,418	6,892
Indian	102	.6	74	28
Bureau of Land Mgmt.	404	2.6	162	242
Other	1	--	0	1
Total	11,817		4,654	7,163
State	940	5.9	631	309
Private: ¹				
Farm	1,229	7.8	851	378
Industrial and other	1,837	11.6	1,624	213
Total	3,066		2,475	591
Total, all ownerships	15,823	100.0	7,760	8,063

¹ Includes a negligible amount of county and municipal ownership.

Table 13.—Commercial forest land area, by stand-size classes and State subunits, Idaho, 1954

Stand-size class	State		Northern		Southern	
	Thousand acres	Percent	Thousand		Thousand acres	Percent
			acres	Percent		
Sawtimber stands	8,741	55.3	3,521	45.4	5,220	64.7
Poletimber stands	3,911	24.7	1,891	24.4	2,020	25.1
Seedling-sapling stands	1,598	10.1	1,164	15.0	434	5.4
Nonstocked and other areas	1,573	9.9	1,184	15.2	389	4.8
Total, all classes	15,823	100.0	7,760	100.0	8,063	100.0

Table 14.—Commercial forest land area, by major forest types and State subunits,
Idaho, 1954

Forest type	State		Northern	Southern
	Thousand acres	Percent	Thousand acres	
Western white pine group:				
Western white pine ¹	1,920	12.1	1,920	0
Western redcedar	258	1.6	258	0
Total	2,178		2,178	0
Ponderosa pine	2,624	16.6	1,109	1,515
Western larch	730	4.6	724	6
Douglas-fir	4,798	30.3	1,286	3,512
Hemlock ²	167	1.1	165	2
Lodgepole pine group:				
Lodgepole pine	2,998	18.9	1,209	1,789
Whitebark and limber pines	25	.2	(³)	25
Total	3,023		1,209	1,814
Spruce-fir group:				
Engelmann spruce	463	2.9	214	249
Grand fir	874	5.5	825	49
Subalpine fir	418	2.7	0	418
Total	1,755		1,039	716
Hardwoods ⁴	548	3.5	50	498
Total, all types	15,823	100.0	7,760	8,063

¹ The white pine type requires 20 percent or more volume plurality in the white pine species; all other types require 50 percent volume plurality in the characteristic species.

² Principally western hemlock type but includes mountain hemlock type.

³ Less than 0.5 thousand acres.

⁴ Predominantly aspen (482,000 acres).

Table 15.—Net board-foot volume¹ of live sawtimber on commercial forest land, by stand-size classes and State subunits, Idaho, 1954

Stand-size class	State		Northern		Southern	
	Million bd.-ft.	Percent	Million bd.-ft.	Percent	Million bd.-ft.	Percent
Sawtimber stands	109,785	95.5	58,143	95.8	51,642	95.2
Poletimber stands	4,521	3.9	2,133	3.5	2,388	4.4
Seedling-sapling stands	356	.3	183	.3	173	.3
Nonstocked and other areas	292	.3	226	.4	66	.1
Total, all classes	114,954	100.0	60,685	100.0	54,269	100.0

¹ International $\frac{1}{4}$ -inch log rule..

**Table 16.—Net board-foot volume¹ of live sawtimber on commercial forest land,
by ownership classes and State subunits, Idaho, 1954**

Ownership class	State		Northern	Southern
	Million board feet	Percent	Million board feet	
Federally owned or managed:				
National forest	80,532	70.1	33,333	47,199
Indian	388	.3	310	78
Bureau of Land Mgmt.	2,158	1.9	860	1,298
Other	2	--	0	2
Total	83,080		34,503	48,577
State	9,433	8.2	7,311	2,122
Private:²				
Farm	5,860	5.1	4,115	1,745
Industrial and other	16,581	14.4	14,756	1,825
Total	22,441		18,871	3,570
Total, all ownerships	114,954	100.0	60,685	54,269

¹ International $\frac{1}{4}$ -inch log rule.

² Includes a negligible volume in county and municipal ownership.

**Table 17.—Net board-foot volume¹ of live sawtimber on commercial forest land,
by species and State subunits, Idaho, 1954**

Species	State		Northern	Southern
	Million board feet	Percent	Million board feet	
Softwoods:				
Western white pine	13,381	11.6	13,381	0
Ponderosa pine	19,297	16.8	6,931	12,366
Western larch	6,110	5.3	5,553	557
Douglas-fir	36,587	31.8	11,390	25,197
Grand fir	13,695	11.9	10,720	2,975
Subalpine fir	5,519	4.8	1,225	4,294
Western redcedar	3,098	2.7	3,098	0
Western hemlock ²	2,191	1.9	2,191	0
Engelmann spruce	9,635	8.4	4,770	4,865
Lodgepole pine	4,816	4.2	1,224	3,592
Whitebark and limber pines	309	.3	35	274
Total	114,638		60,518	54,120
Hardwoods:				
Aspen	75	.1	(³)	75
Cottonwood	241	.2	167	74
Birch	0		0	0
Total	316		167	149
Total, all species	114,954	100.0	60,685	54,269

¹ International $\frac{1}{4}$ -inch log rule.

² Includes 78 million board feet of mountain hemlock.

³ Less than 0.5 million board feet.

Table 18.—Net cubic-foot volume of growing stock on commercial forest land, by species and State subunits, Idaho, 1954

Species	State		Northern	Southern
	Million cubic feet	Percent	Million cubic feet	
Softwoods:				
Western white pine	2,389	9.2	2,389	0
Ponderosa pine	3,236	12.5	1,220	2,016
Western larch	1,333	5.2	1,232	101
Douglas-fir	7,665	29.6	2,462	5,203
Grand fir	2,709	10.4	2,186	523
Subalpine fir	1,514	5.8	310	1,204
Western redcedar	740	2.9	740	0
Western hemlock ¹	506	2.0	506	0
Engelmann spruce	1,790	6.9	860	930
Lodgepole pine	3,694	14.2	1,249	2,445
Whitebark and limber pines	116	.4	12	104
Total	25,692		13,166	12,526
Hardwoods:				
Aspen	189	.7	(²)	189
Cottonwood	59	.2	39	20
Birch	5	0	5	0
Total	253		44	209
Total, all species	25,945	100.0	13,210	12,735

¹ Includes 18 million cubic feet of mountain hemlock.

² Less than 0.5 million cubic feet.

Table 19.—Net board-foot volume¹ of live sawtimber on commercial forest land, by diameter class groups and State subunits, Idaho, 1954

Diameter class group (inches)	State		Northern	Southern
	Million board feet	Percent	Million board feet	
11.0 - 20.9	57,661	50.2	32,838	24,823
21.0 - 30.9	37,530	32.6	19,608	17,922
31.0 - 40.9	15,183	13.2	6,478	8,705
41.0 and larger	4,580	4.0	1,761	2,819
Total, all diameters	114,954	100.0	60,685	54,269

¹ International ¼-inch log rule.

Table 20.—Net cubic-foot volume of all timber on commercial forest land, by classes of material and State subunits, Idaho, 1954

Class of material	State		Northern	Southern
	Million cubic feet	Percent	Million cubic feet	
Growing stock:				
Sawtimber trees:				
Sawlog portion	16,775	56.1	8,879	7,896
Upper stem portion	2,084	7.0	883	1,201
Total	18,859		9,762	9,097
Poletimber trees	7,086	23.7	3,448	3,638
Total, growing stock	25,945		13,210	12,735
Other material:				
Sound cull trees	493	1.6	195	298
Rotten cull trees	1,843	6.2	1,749	94
Hardwood limbs	1	0	(¹)	1
Salvable dead trees	1,614	5.4	555	1,059
Total	3,951		2,499	1,452
Total, all timber	29,896	100.0	15,709	14,187

¹ Less than 0.5 million cubic feet.

Table 21.—Total land area, commercial forest land area, and live sawtimber volume on commercial forest land, by State subunits and counties, Idaho, 1954

County	Live sawtimber volume ²				County	Live sawtimber volume ²						
	Total land area ¹	Commercial forest land area	Thousand acres	Thousand acres		Total land area ¹	Commercial forest land area	Thousand acres	Thousand acres	Percent	Million board feet	
NORTHERN IDAHO												
Benewah	506	393	2.5	1,946	Kootenai	804	591	3.7	3,320			
Bonner	1,111	884	5.6	4,899	Latah	698	417	2.6	3,240			
Boundary	816	547	3.5	3,725	Lewis	306	92	.6	426			
Clearwater	1,614	1,329	8.4	15,158	Nez Perce	542	101	.6	523			
Idaho ³	4,500	1,977	12.5	18,070	Shoshone	1,670	1,429	9.0	9,378			
					Total, Northern	12,567	7,760	49.0	60,685			
SOUTHERN IDAHO												
Ada	670	3	(⁴)	12	Gem	355	45	.3	524			
Adams	881	450	2.9	5,873	Gooding	462	0	0	0			
Bannock	719	92	.6	334	Idaho ³	949	384	2.4	3,519			
Bear Lake	632	140	.9	522	Jefferson	697	0	0	0			
Bingham	1,326	35	.2	110	Jerome	380	0	0	0			
Blaine	1,695	250	1.6	1,208	Lemhi	2,934	1,249	7.9	5,904			
Boise	1,224	838	5.3	7,397	Lincoln	770	0	0	0			
Bonneville	1,181	273	1.7	882	Madison	303	46	.3	129			
Butte	1,434	109	.7	499	Minidoka	480	0	0	0			
Camas	677	126	.8	855	Oneida	762	38	.2	98			
Canyon	371	1	(⁴)	1	Owyhee	4,895	12	.1	21			
Caribou	1,118	272	1.7	671	Payette	258	(5)	(⁴)	(⁶)			
Cassia	1,628	63	.4	229	Power	903	51	.3	153			
Clark	1,121	196	1.3	1,538	Teton	294	84	.5	243			
Custer	3,157	960	6.1	3,824	Twin Falls	1,243	20	.1	28			
Elmore	1,960	393	2.5	3,850	Valley	2,354	1,311	8.3	12,621			
Franklin	427	53	.3	307	Washington	944	84	.5	1,046			
Fremont	1,164	485	3.1	1,871	Yellowstone	National Park	37	0	0	0		
					Total, Southern	40,405	8,063	51.0	54,269			
					Total, Idaho	52,972	15,823	100.0	114,954			

¹ County land area from U.S. Bureau of the Census: Land and Water Area of the United States, 1950.

² Trees 11.0 inches d.b.h. and larger, measured by International 1/4-inch log rule.

³ Idaho County is divided by the Salmon River and lies partly in each state subunit.

⁴ Less than 0.05 percent.

⁵ Less than 0.5 thousand acres.

⁶ Less than 500 thousand board feet.

Table 22.—Percent of commercial forest land by stand-size classes, State subunits, and stocking classes¹, Idaho, 1954

Stand-size class	State				Northern				Southern			
	Well	Medium	Poor	Total	Well	Medium	Poor	Total	Well	Medium	Poor	Total
Sawtimber stands	13.9	19.8	21.6	55.3	13.2	15.3	16.9	45.4	14.6	24.1	26.0	64.7
Poletimber stands	10.2	9.5	5.0	24.7	9.8	8.2	6.4	24.4	10.6	10.8	3.7	25.1
Seedling-sapling stands	4.2	2.9	3.0	10.1	5.9	3.9	5.2	15.0	2.5	1.9	1.0	5.4
Total, stocked	28.3	32.2	29.6	90.1	28.9	27.4	28.5	84.8	27.7	36.8	30.7	95.2
Nonstocked and other areas	0	0	0	9.9	0	0	0	15.2	0	0	0	4.8
Total, all classes	—	—	—	100.0	—	—	—	100.0	—	—	—	100.0

¹ Percentage of available space occupied by tree crowns: well stocked—over 70 percent; medium stocked—40 to 70 percent; poorly stocked—10 to 40 percent; nonstocked—less than 10 percent.

Table 23.—Area of commercial forest land by stocking classes, major forest types, and State subunits, Idaho, 1954

Stocking class ¹	Western white pine	Ponderosa pine	Western larch	Douglas-fir	Western hemlock	Western redcedar	Lodgepole pine ²	Spruce-fir ³	Hardwoods	Total
	Thousands of acres									
IDAHO										
Well	563	471	231	1,167	41	62	1,307	396	235	4,473
Medium	261	744	226	1,735	52	101	1,022	694	254	5,089
Poor	416	1,122	208	1,622	47	86	551	587	49	4,688
Nonstocked and other	680	287	65	274	27	9	143	78	10	1,573
Total	1,920	2,624	730	4,798	167	258	3,023	1,755	548	15,823
NORTHERN IDAHO										
Well	563	228	230	271	41	62	540	290	16	2,241
Medium	261	353	225	456	52	101	285	370	21	2,124
Poor	416	363	205	461	47	86	291	339	3	2,211
Nonstocked and other	680	165	64	98	25	9	93	40	10	1,184
Total	1,920	1,109	724	1,286	165	258	1,209	1,039	50	7,760
SOUTHERN IDAHO										
Well	0	243	1	896	0	0	767	106	219	2,232
Medium	0	391	1	1,279	0	0	737	324	233	2,965
Poor	0	759	3	1,161	0	0	260	248	46	2,477
Nonstocked and other	0	122	1	176	2	0	50	38	0	389
Total	0	1,515	6	3,512	2	0	1,814	716	498	8,063

¹ Percentage of available space occupied by tree crowns: well stocked—over 70 percent; medium stocked—40 to 70 percent; poorly stocked—10 to 40 percent; nonstocked—less than 10 percent.

² Includes whitebark pine and limber pine types.

³ Engelmann spruce, grand fir, and subalpine fir types.

Table 24.—Net annual growth of live sawtimber¹ on commercial forest land by species and State subunits, Idaho, 1954

Species	State		Northern	Southern
	Million board feet	Percent	Million board feet	
Softwoods:				
Western white pine	202	12.3	202	0
Ponderosa pine	223	13.6	93	130
Western larch	54	3.3	49	5
Douglas-fir	445	27.0	191	254
Grand fir	318	19.3	249	69
Subalpine fir	71	4.3	11	60
Western redcedar	59	3.6	59	0
Hemlock	27	1.6	27	0
Spruce	134	8.1	42	92
Lodgepole pine	97	5.9	30	67
Other softwoods	6	.4	2	4
Total	1,636		955	681
Hardwoods	10	.6	4	6
Total, all species	1,646	100.0	959	687

¹ International $\frac{1}{4}$ -inch log rule.

Table 25.—Net annual growth of growing stock on commercial forest land by species and State subunits, Idaho, 1954

Species	State		Northern	Southern
	Million cubic feet	Percent	Million cubic feet	
Softwoods:				
Western white pine	44	9.4	44	0
Ponderosa pine	41	8.8	19	22
Western larch	25	5.3	23	2
Douglas-fir	117	25.0	52	65
Grand fir	71	15.1	59	12
Subalpine fir	22	4.7	5	17
Western redcedar	18	3.8	18	0
Hemlock	8	1.7	8	0
Spruce	32	6.8	12	20
Lodgepole pine	80	17.1	38	42
Other softwoods	2	.4	(¹)	2
Total	460		278	182
Hardwoods	9	1.9	(¹)	9
Total, all species	469	100.0	278	191

¹ Less than 0.5 million cubic feet.

Table 26.—Average board-foot volume per acre¹ of live sawtimber on commercial forest land, by stand-size classes and State subunits, Idaho, 1954

Stand-size class	State	Northern	Southern
Sawtimber stands	12,560	16,513	9,893
Poletimber stands	1,156	1,128	1,182
Seedling-sapling stands	223	157	399
Nonstocked and other areas	186	191	170
All classes	7,265	7,820	6,731

¹ International $\frac{1}{4}$ -inch log rule.

Table 27.—Average cubic-foot volume per acre of growing stock on commercial forest land, by stand-size classes and State subunits, Idaho, 1954

Stand-size class	State	Northern	Southern
Sawtimber stands	2,397	3,000	1,990
Poletimber stands	1,192	1,280	1,109
Seedling-sapling stands	165	153	198
Nonstocked and other areas	43	41	49
Total	1,640	1,702	1,579

